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(71) Applicant

Michael Jefferson Lawrence
Christmas Cottage, Scatterdells Lane, Chipperfield,
Hertfordshire, WD4 9SZ, United Kingdom

(72) Inventor

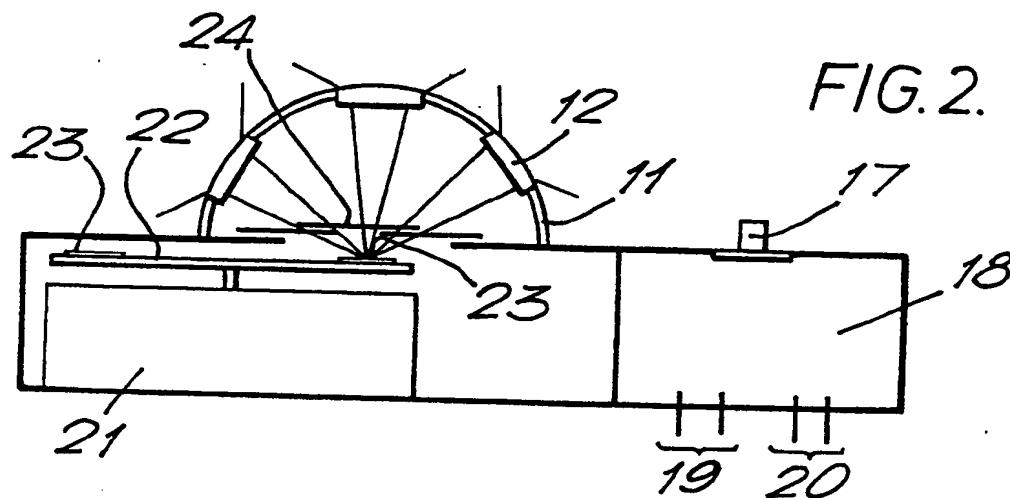
Michael Jefferson Lawrence

(74) Agent and/or Address for Service

King's Patent Agency Limited
73 Farringdon Road, London, EC1M 3JB,
United Kingdom

(54) "Vehicle security camera"

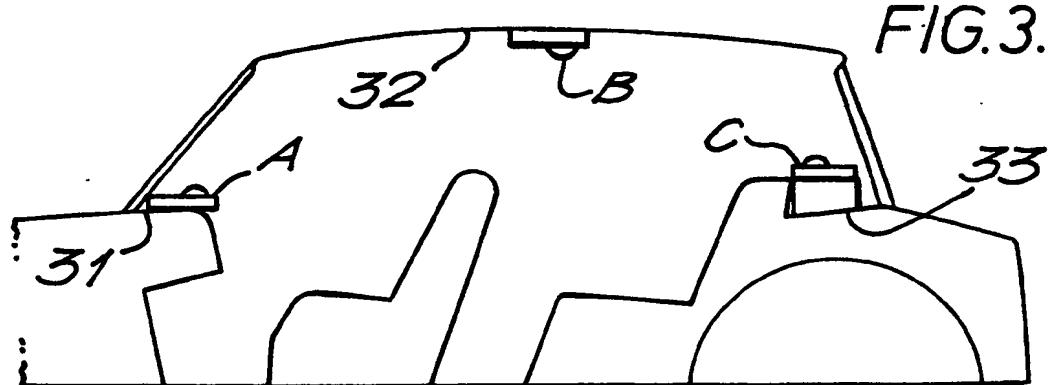
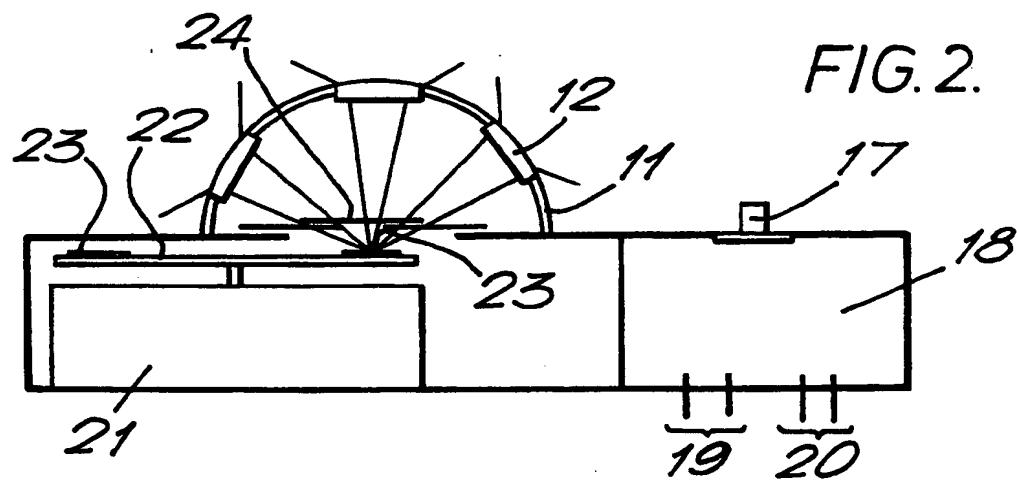
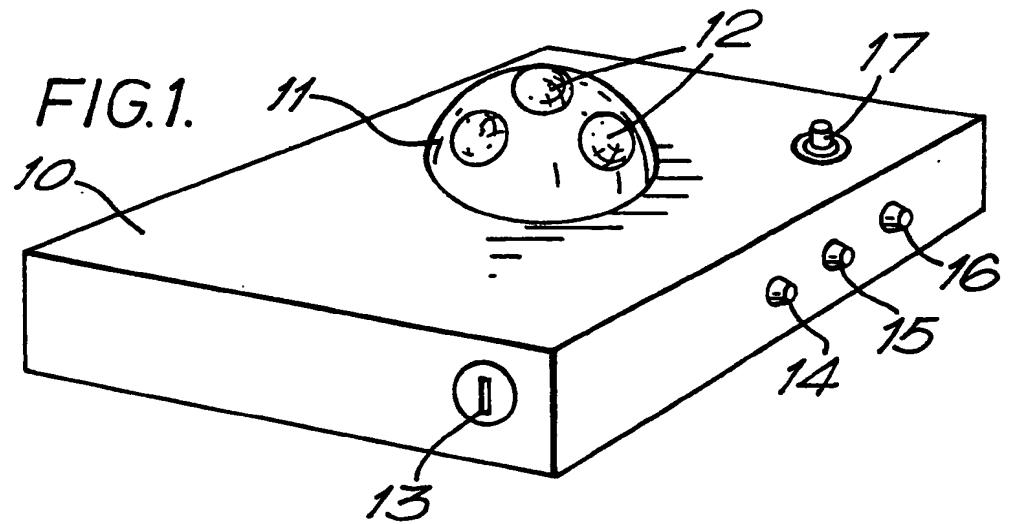
(57) A vehicle security camera comprises a plurality of fish-eye lenses 12 with overlapping fields of view, mounted in a dome shaped lens holder 11, to provide respective separately and discretely focused images on a recording medium (frame 23 of a photographic disc film 22). The lens holder 11 is positioned with as clear a view in and around the vehicle as possible, and the camera is actuable automatically by sensors detecting tampering with the vehicle, a collision, or the approach of an intruder, or by an occupant of the vehicle anticipating trouble. The recording medium may be video tape, and provision may be made for recording sounds and other data.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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Vehicle Security Camera

This invention relates to a vehicle security camera, which may be automatically triggered in an emergency to make a photographic record of for example a collision, or an attempted or accomplished break-in, or initiated by an 5 occupant when an emergency is anticipated.

Such a device is intended to provide a photographic record to give prima-facie evidence of the cause and sequence of events in a collision, or the identity of an intruder, etc.

A record of this kind may be for example of great 10 value to police, civil courts and insurers in establishing the causes, sequence of events, and responsibility in accidents; and in the detection and prosecution of theives involved in car-related crime (theft of or from motor vehicles) as well as in personal assaults on the occupants of vehicles.

15 According to the invention, a vehicle security camera is adapted to be mounted in a vehicle so as to command an all-round view of the interior of the vehicle, and of the exterior of the vehicle through the vehicle windows, and includes one or more lenses adapted to give a wide field of view, the 20 camera being operative automatically to take a plurality of exposures at predetermined intervals on activation, activation being by means for detecting the onset of an emergency, or by operation of a switch by an occupant of the vehicle.

The camera may record the images magnetically or photo- 25 chemically (by video tape or photographic film) and the record may comprise still or moving pictures.

The camera may have a plurality of so-called 'fish-eye' (very wide field) lenses, arranged to give complete coverage, with overlapping fields, and focus their respective images onto discrete areas of each frame of the 5 recording medium (tape or film).

The camera may be of the disc kind, although roll film or cassette film with automatic wind-on may be used. The mechanism may be set to take exposures and wind-on at say 5 or 10 second intervals. The camera may use a flash unit, or 10 compensate for poor light by automatic shutter regulation.

The camera may have a control unit which operates the shutter and wind-on mechanism, which is connected to impact sensors, as already used for operating electronically locked doors, and to sensors for detecting tampering with or forcing 15 of doors or locks, as well as a push button switch operable by an occupant.

The camera is preferably contained in a strong impact resistant casing, for example 1/4 inch stainless or mild steel. It may be mounted on the front ledge, rear shelf, or in or 20 under the ceiling of the car saloon or vehicle cab.

A preferred embodiment of the invention will now be described by way of example with reference to the accompanying drawings, wherein:-

Fig. 1 is a perspective view of the exterior of the 25 camera;

Fig. 2 is a cross-sectional diagrammatic view of the camera; and

Fig. 3 is a diagram showing possible alternative mounting positions for the camera in a saloon car.

As shown in Fig. 1, the camera is housed in a steel casing 10, of strong 1/4 inch stainless steel. A lens-holder 5 dome 11 projects from the casing, and holds a plurality of 'fish-eye' lenses 12, with over-lapping fields of view. 'Fish-eye' lenses typically have fields of view of about 180°, and are used in security viewing devices such as door peep holes, and in all-sky cameras for astronomical or meteorological purposes. The casing 10 includes a key-slot 13 which accepts the vehicle ignition key to switch the camera 'on', in which state it is ready to be triggered, and 'off'; and three indicator lights, to indicate respectively that a new film, cartridge or disc is required (14), that the camera is 15 'live' (15), and an indicator that the camera has operated (16). An actuation button 17 is also provided to enable an occupant to trigger the camera.

Fig. 2 shows that the lenses 12 each focus onto a separate area of the frame 23 of sensitised film or other 20 recording medium, carried here on a disc 22, which has a winding-on motor 21. The motor 21 is controlled by circuitry in a control unit 18, as is the camera shutter 24, and the control unit can be triggered to operate the camera by operation of the button 17, or by detection by an impact 25 detector (input leads 19), or of tampering with a door, e.g. with the lock, or attempted foicing (input leads 20).

The unit 18 operates the shutter 24 and the motor 21 to take a series of exposures, e.g. a programmed number at preset intervals, such as at 5 or 10 second intervals, which show the interior of the car and its surroundings through 5 the windows. A photographic record will thus be obtained of for example the sequence of events in a collision, or an attempted or accomplished break-in, or of an assault on an occupant, which will be useful in investigating traffic accidents, insurance claims, and identifying theives and 10 assailants; and perhaps in evidence in civil and criminal proceedings.

The indicator lights function to indicate when a film disc is used up (14), that the device is 'live' and will operate if triggered (15), while light 16 will indicate that 15 the camera has operated - e.g. if the vehicle has been left unattended, and there has been an attempted break-in or an unreported hit-and-run collision.

The operation of the camera may be triggered by sensors for detecting body heat, or movement, which may be placed 20 for example under the vehicle body, or below the engine bonnet and thus images of people approaching the vehicle would be recorded without any external indication. The control device 18 may be swithched 'on' and 'off' by a remote control device such as used for controlling televisions, so that the 25 the owner may switch 'off' the device as he approaches, thus avoiding needless accuation by an authorised approach and entry.

The camera may include a flash unit, or rely on a light meter and shutter speed and aperture control to compensate for poor light. If flash is used, its operation may act as a deterrent to a theif, as may warning notices that 5 the vehicle is equipped with the device.

The camera is preferably internally self powered, by dry cell or other suitable batteries, for security, and these batteries may be arranged to be recharged when the vehicle engine is running.

10 Some possible alternative positions for the camera in a saloon car 30 are indicated in Fig. 3. On the front ledge 31 (position A), on the rear shelf 33 (position C), or in or suspended from the ceiling 32 (position B), are examples. These locations are not an exhaustive list, and other places 15 may be used, and the best location for each type and model of vehicle may need to be determined by experiment.

The camera should have a high probability of surviving a serious collision, or vandalism, because of its robust casing. Steel is preferred to even the most robust of plastics 20 as these will eventually crack through fatigue and chemical deterioration.

At a minimum, a single fish-eye or other ultra wide angle lens may be used as the camera objective, but the safeguard of a plurality of independantly imaged overlapping 25 fields of view is preferred, particularly as one or more lenses may be obstructed or damaged by a colision or vandalism.

The lenses may be mounted remote from the camera body, fibre optic cables being used to transmit the images from the image planes to the recording medium. A magnetic recording medium, e.g. video tape, may be used instead of 5 photo-chemical film, and be used to record discrete still images, or to provide a real-time or accelerated motion picture record. Simultaneous sound recording may also be provided for, using magnetic tape to record the sounds arising during a collision, and/or conversation or other 10 sounds made by intruders. Verbal comments made by intruders may give evidence of intent. The same tape may also record on a separate channel digitally coded information of date and time from a calender clock device, and data relating to the handling and performance of the vehicle. This data may 15 be processed and fed to the tape record by a microprocessor including suitably preprogrammed chips for data processing, storage and output.

Claims

1. A security camera for mounting in a vehicle so as to command an all-round view of the interior of the vehicle and of the exterior through the vehicle windows, including one or more lenses adapted to give a wide field of view, the 5 camera being operated to automatically record a plurality of images at pre-set intervals on activation, activation being by means for detecting the onset of an emergency, or by operation of a switch by an occupant of the vehicle.
2. A camera according to Claim 1, wherein the camera has 10 an objective assembly comprising a dome having a plurality of fish-eye lenses, having their optical axes inclined each to that of every other such lens in the assembly, arranged to give complete all-round coverage with overlapping fields and to focus their respective images onto respective discrete 15 areas of the recording medium.
3. A camera according to Claim 1 or 2 wherein the camera is adapted to automatically operate its shutter, and wind on its film for a number of exposures on activation, activation being by means of detectors for sensing tampering, close 20 approach of an intruder, or collision.
4. A camera according to any preceding Claim, wherein the recording medium is a photographic film.
5. A camera according to any preceding Claim, wherein the recording medium is a magnetic medium such as video tape.
- 25 6. A camera according to Claim 5 wherein the images are recorded as accelerated or real time motion pictures.

7. A camera according to any of Claims 1 to 6 wherein the images are recorded as a series of still pictures, at 5 to 10 second intervals.
8. A camera according to any preceding Claim, wherein 5 provision is made for simultaneous recording of sound.
9. A camera according to Claim 8 wherein the tape used to record sound is also to record digital data such as date and time, etc processed by a suitably programmed microprocessor.
- 10 10. A camera according to any preceding claim, wherein the lenses are mounted away from the recording medium, and connected thereto by fibre optics to transmit the focused images.
- 11 A security camera for mounting in a vehicle, 15 substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

Amendments to the claims have been filed as follows

1. A security camera for mounting in a vehicle so as to command an all-round view of the interior of the vehicle and of the exterior through the vehicle windows, including two or more lenses each adapted to give a wide field of view, the 5 field of each lens overlapping with the field of at least one other lens, the camera being operated to record automatically the images provided by such lenses at preset intervals after activation, activation being by means for detecting the onset of an emergency, or by operation of a switch by an occupant of 10 the vehicle.

2. A camera according to Claim 1, wherein the camera has an objective assembly comprising a dome having a plurality of fish-eye lenses, the optical axes of which are each inclined to each of the others, the lenses being arranged to give 15 complete all-round coverage with overlapping fields of view and to focus their respective images onto respective discrete areas of the recording medium.

A camera according to Claim 1 or 2 wherein the camera is adapted to automatically operate its shutter, and wind on 20 its film for a plurality of exposures after activation, this being by means of detectors for sensing tampering, close approach of an intruder, or collision.

4. A camera according to any preceding Claim, wherein the recording medium is a photographic film, or a magnetic medium 25 such as video tape.

5. A camera according to Claim 4 wherein the images are recorded either as accelerated or as real time motion pictures.

6. A camera according to any of Claims 1 to 5 wherein the images are recorded as a series of still pictures, at 5 to 10 second intervals.

7. A camera according to any preceding Claim, wherein provision is made for simultaneous recording of sound.

8. A camera according to Claim 7 wherein the tape used to record sound is also to record digital data such as date and time, etc processed by a suitably programmed microprocessor.

10 9. A camera according to any preceding claim, wherein the lenses are mounted away from the recording medium, and connected thereto by fibre optics to transmit the focused images.

110 A security camera for mounting in a vehicle, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.